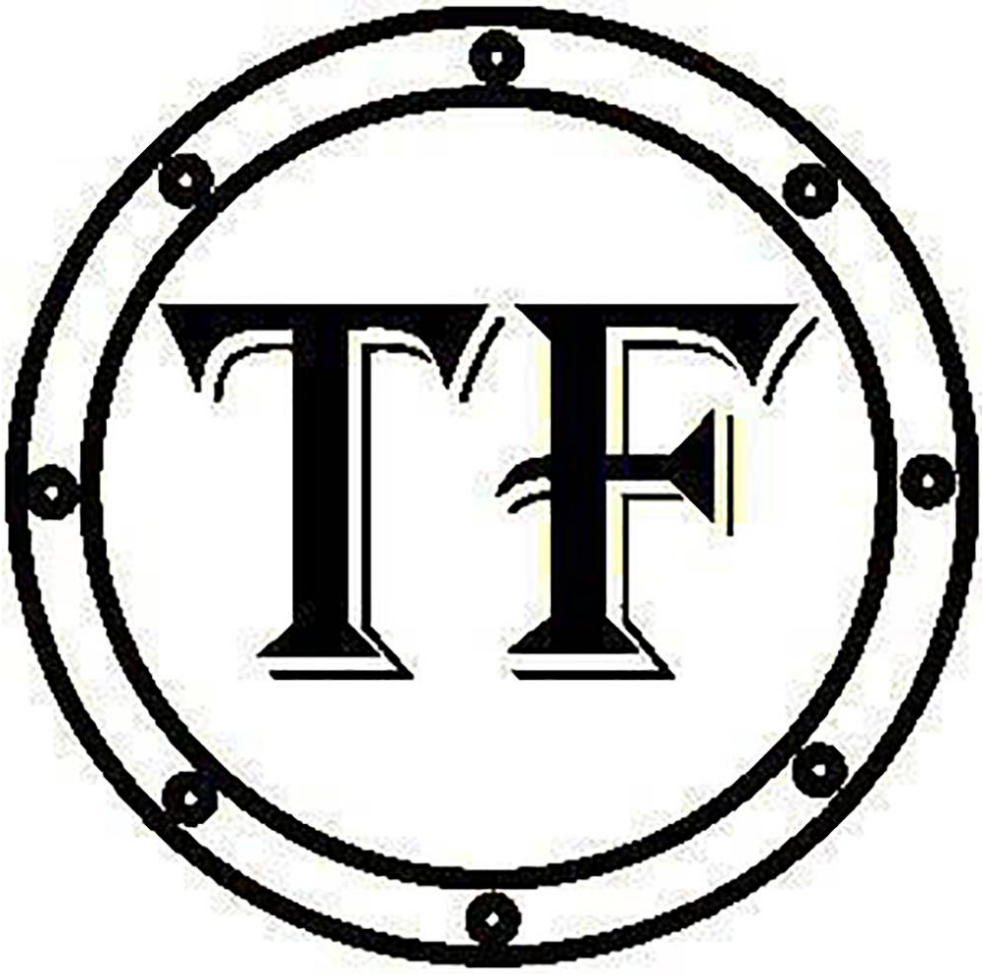
Weld Neck Flange

Weld neck flange welding are the most popular flange type with a neck extension with a weld bevel at the end. This type of flange is designed to butt weld directly to pipe to provide a superior and relatively natural form connection.

In larger sizes and higher pressure classes, this is almost exclusively the type of flange connection utilized. If only one bored flange style existed in modern applications, the weld neck would be your flange of choice.



Advantages of Weld Neck Flanges

Steel welding neck flanges (WN flanges) are a top choice for industries requiring durability and strength in high-pressure systems.

Their unique design reduces stress concentration at the base, ensuring reliability in demanding environments. A reducing weld neck flange provides an ideal solution for connecting pipes of different sizes while maintaining system integrity.

With raised face and other face types available, these flanges offer versatility for various applications. The tapered hub design facilitates smooth stress distribution, making weld neck flanges a superior option for long-term performance.

Weld neck with matching bevel to pipe

The weld bevel joins to a pipe end with a similar bevel in a V-type connection which allows for a uniform circular weld around the perimeter to form a unified transition.

This allows for the gas or liquid within the pipe assembly to flow with minimal restriction through the flange connection. This weld bevel connection is inspected after the weld procedure to ensure that the seal is uniform and lacking anomalies.

The other noticeable feature of the weld neck flange is the tapered hub.

This type of connection provides a more gradual distribution of pressure forces along the transition from the pipe to the base of the flange, helping to withstand some of the shock from use in a higher pressure and higher temperature operating environment.

The mechanical stresses are limited given the extra steel material along the hub transition.

As higher pressure classes require this type of flange connection almost exclusively, weld neck flanges are often made with a ring type joint facing (otherwise known as RTJ face).

This sealing surface allows for a metallic gasket to be crushed between the grooves of both connecting flanges to form a superior seal and complement the high strength weld bevel connection to the pressurized pipe assembly. An RTJ weld neck with a metal gasket connect is the primary choice for critical applications

Ring joint gaskets for RTJ weld necks

LONG WELD NECK FLANGES

Also known as nozzle flanges or “long neck” flanges, these items were designed specifically with the pressure vessel and tank fabrication industry in mind.

They are usually made as a one-piece construction with the intention of replacing a standard weld neck and pipe weld combination. The lack of a necessary weld connection is the defining feature of this flange style.

They usually have one straight thru bore with a square cut end (instead of the typical weld neck bevel). Generally, the bore size of the long weld neck is the exact same as the actual nominal pipe size but can be changed as necessary.

The overall length of the nozzle flange is also up to the end user, and the body of the nozzle can be modified to some pre-existing sizes or custom sizes for additional reinforcement.

The base of the neck connecting to the base of the flange is slightly radiused to alleviate the abrupt perpendicular connection between both portions of the flange and to solidify the idea of a reinforced one piece construction.

CAD rendering of a LWN

Per ASME B16.5 subsection 2.8, these flange styles are also known as “straight hub welding flanges” and are given minimal detail in the governing specification.

This is due to the fact that long weld necks are chosen on a per-application basis, depending on the particular engineering requirements of a given tank or pressure vessel.

The operating pressure, temperature, and media of the vessel are all critical factors in determining just what type of long weld neck flange connection you require.

Aside from standard long weld necks, Texas Flange also offers a variety of nozzle connections with varying wall thicknesses.

Reinforced barrel flanges in nozzle form are an option when your pressure vessel requires a stronger outlet connection and can be provided with barrel thickness you desire.

Please contact us regarding your specific application as we can provide nozzle flanges in all commercially available material grades, including carbon, stainless, and nickel alloys.

What is a weld neck flange?

A weld neck flange is a type of pipe flange characterized by a long, tapered neck that extends gradually from the flange face to the base of the pipe.

The design provides a smooth transition between the pipe and the flange, reducing stress concentration and enhancing structural integrity. Weld neck flanges are typically used in critical applications that demand a robust and leak-proof connection.

What are the advantages of weld neck flanges?

The tapered neck allows for even distribution of mechanical stress, making these flanges ideal for high-pressure and high-temperature environments.

The welded joint provides a seamless, leak-proof connection, especially crucial in hazardous or critical fluid systems.

When should I use a weld neck flange?

High-pressure systems, such as oil and gas pipelines, where the integrity of connections is paramount.

High-temperature applications, like steam systems in power plants or chemical processing, where stress resistance is critical.

High-vibration environments, such as reciprocating pumps, compressors, or turbines, where the flange needs to resist movement and fatigue.

When should I not use a weld neck flange?

Avoid weld neck flanges in low-pressure or non-critical systems, where simpler and less expensive alternatives, like slip-on or lap joint flanges, would suffice. And in a cost-sensitive projects, as weld neck flanges require precise welding, skilled labor, and rigorous inspection, leading to higher costs.

How do I install a weld neck flange?

Cut and bevel the end of the pipe to match the taper of the weld neck flange neck.

Clean both the pipe and flange surfaces to ensure a good weld and prevent contamination.

Align the flange face with the mating flange or equipment to ensure proper fit and avoid misalignment, which can cause leaks.

Use alignment tools or temporary tack welds for precise positioning.

Perform a butt weld to join the beveled pipe end to the neck of the flange.